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of the Parties to the Treaty
on the Non-Proliferation of Nuclear Weapons

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DYNAMICS AND CONSEQUENCES OF THE NUCLEAR-ARMS RACE INCLUDING ITS QUANTITATIVE, QUALITATIVE AND VERTICAL ASPECTS

Background paper by the Secretariat

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INTRODUCTION

1. The Preparatory Committee for the Fourth Review Conference of the Parties to the Treaty on the Non-Proliferation of Nuclear Weapons, at its first session, from 1 to 5 May 1989, invited the Secretary-General of the United Nations to prepare for the Committee's second session a background paper on the dynamics and consequences of the nuclear-arms race, including its quantitative, qualitative and vertical aspects. At the request of the Committee, at its second session (11 to 15 September 1989), the background paper was revised and updated for the Committee's third session (23 April-2 May 1990). At that session, the Committee requested that, in the light of the comments made during its discussions, the background paper be updated and revised as necessary where appropriate for submission to the Conference. This paper is submitted in response to that request and covers developments up to 10 June 1990.

2. On the question of the nuclear-arms race, and especially on the role nuclear weapons play in national security, there are differences of perceptions between nuclear-weapon States (with their allies) and non-nuclear-weapon States, and among the nuclear-weapons States themselves. There is, therefore, a variety of contending views about the motivation, causation and dynamics of the nuclear-arms race and its consequences. As a result, the present paper not only deals with issues of great complexity and sensitivity, but also with issues that are controversial in many respects. Under these circumstances, while all possible efforts have been made to reflect the main viewpoints in an objective and balanced manner, it may be unavoidable that some parties feel that their views have not been duly represented. To minimize this, an attempt has been made to give chapter I of the paper a purely descriptive character. Chapter II is based entirely on United Nations sources or other sources within its framework.

3. In the debates on the question of the cessation of the nuclear-arms race and nuclear disarmament at the first, second and third Review Conferences of the Parties to the Non-Proliferation Treaty, a large number of the non-nuclear-weapon States, including several developed countries, expressed the view that, while the immediate objective of the Treaty was to prevent the "horizontal" proliferation of nuclear weapons, the Treaty would lose its credibility unless efforts were also made to prevent the "vertical" proliferation of those weapons. The interrelation between these two dimensions, it was pointed out, had found recognition not only in the Non-Proliferation Treaty, but also in other prominent statements and documents, notably, the Final Document of the Tenth Special Session of the General Assembly adopted by consensus in 1978 (resolution S-10/2).

4. The relevant paragraphs of the Final Document read as follows:

> "65. It is imperative, as an integral part of the effort to halt and reverse the arms race, to prevent the proliferation of nuclear weapons. The goal of nuclear non-proliferation is on the one hand to prevent the emergence of any additional nuclear-weapon States besides the five existing nuclear-weapon States, and on the other progressively to reduce and eventually eliminate nuclear weapons altogether. This involves obligations and responsibilities on the part of both nuclear-weapon States and non-nuclear-weapon States, the former undertaking to stop the

nuclear arms race and to achieve nuclear disarmament by urgent application of the measures outlined in the relevant paragraphs of this Final Document, and all States undertaking to prevent the spread of nuclear weapons.

"66. Effective measures can and should be taken at the national level and through international agreements to minimize the danger of the proliferation of nuclear weapons without jeopardizing energy supplies or the development of nuclear energy for peaceful purposes. Therefore, the nuclear-weapon States and the non-nuclear-weapon States should jointly take further steps to develop an international consensus of ways and means, on a universal and non-discriminatory basis, to prevent the proliferation of nuclear weapons."

5. The Final Document also set out, for the first time in the history of the United Nations, an agreed general Programme of Action on Disarmament containing priorities and measures that States should undertake as a matter of urgency. In particular, in paragraphs 45, 47, 49 and 50, the Final Document stated:

"45. Priorities in disarmament negotiations shall be: nuclear weapons; other weapons of mass destruction, including chemical weapons; conventional weapons, including any which may be deemed to be excessively injurious or to have indiscriminate effects; and reduction of armed forces."

"47. Nuclear weapons pose the greatest danger to mankind and to the survival of civilization. It is essential to halt and reverse the nuclear arms race in all its aspects in order to avert the danger of war involving nuclear weapons. The ultimate goal in this context is the complete elimination of nuclear weapons."

"49. The process of nuclear disarmament should be carried out in such a way, and requires measures to ensure, that the security of States is guaranteed at progressively lower levels of nuclear armament, taking into account the relative qualitative and quantitative importance of the existing arsenals of the nuclear-weapon States and other States concerned.

"50. The achievement of nuclear disarmament will require urgent negotiation of agreements at appropriate stages and with adequate measures of verification satisfactory to the States concerned for:

"(a) Cessation of the qualitative improvement and development of nuclear-weapons systems;

"(b) Cessation of the production of all types of nuclear weapons and their means of delivery, and of the production of fissionable material for weapons purposes;

"(c) A comprehensive, phased programme with agreed time-frames, whenever feasible, for progressive and balanced reduction of stockpiles of nuclear weapons and their means of delivery, leading to their ultimate and complete elimination at the earliest possible time.

READEX

"Consideration can be given in the course of the negotiations to mutual and agreed limitation or prohibition, without prejudice to the security of any States, of any types of nuclear armaments."

6. At the Twelfth Special Session of the General Assembly, in 1982, the Secretary-General of the United Nations, noting that, in spite of the decisions of the General Assembly at its Tenth Special Session, the arms race had continued to spread and intensify, stated:

"The more basic premises of the arms race deserve continued reiteration: the fundamental fact about the present arms situation is that neither in quality nor in quantity can it be compared with any ever faced in the history of mankind. National security, of course, has been, and will continue to be, the foremost concern of Governments everywhere. The search for security through strength is as old and as deeply rooted in the life of nations as the desire to live in peace. But what puts the present arms race in an altogether different and still more dangerous category are two of its basic characteristics: first, it derives its momentum not so much from well-considered security goals as from the inexorable advance of military technology and, second, it is a pursuit whose consequences do not accord with its assumed aims. This holds true, to one degree or another, in the fields of both nuclear and conventional weapons." (A/S-12/PV.1, pp. 16-17)

7. At the Fifteenth Special Session of the General Assembly, in 1988, the Secretary-General of the United Nations emphasized that nuclear issues went far beyond national security and impinged directly on human survival. He continued:

"A rational military policy is incompatible with the danger of annihilation of the human race. It is indisputable that a major nuclear exchange would have catastrophic effects on the peoples of combatant as well as non-combatant countries. Nuclear issues will, therefore, rightly remain a major concern of all States and central to global security. It is imperative that the international community continue to press for the sharp reduction and ultimate elimination of such weapons." (A/S-15/PV.1, p. 23)

8. In the report of the Secretary-General entitled "Study on Conventional Disarmament", which was completed in 1984 (A/39/348), and of which the General Assembly took note with satisfaction in consensus resolution 39/151 C, the causes of the arms race were described as follows:

"49. The roots of the present arms race are many and complex. To a large extent they can be found in political and socio-economic differences between the countries from the two groups of States which later came to form the two main alliances. In political terms, the tensions between East and West still constitute the central feature of the present arms race. Behind the arms build-up in the world there is also a complex tangle of criss-crossing conflicts and confrontations, some related to specific situations existing in particular regions and some domestic in origin. Many of these conflicts tend to be drawn into the East-West context, sometimes through the political sympathies or at the initiative of the countries concerned, or sometimes at the initiative of countries of the two groups. This tends to exacerbate both these conflicts themselves and East-West tensions.

"50. Attempts to preserve existing relationships in the world, or to change those relationships in favour of one State or a group of States at the expense of another are also contributing factors to the arms race; in effect, this is detrimental to the security of all countries.

"...

"53. Underlying the global arms build-up is the perception of fundamental political, social and ideological differences and of basic conflicts of interest. Instances of hostile or aggressive conduct, the development and introduction of new and modern weapons or increase in military budgets and forces have frequently led to a perception of danger and have induced other States to take countermeasures. In turn, these are often perceived as threatening or hostile or as attempts to achieve military superiority or to dominate over others. In some cases, counter-weapons have been developed or preventive action has been taken not in response to actual conduct but in anticipation of possible steps by the other side. Finally, there are also different types of causes, such as the existence of internal pressures for weapons and forces emanating from military and civilian establishments. Once an arms race as all-encompassing as the present one is under way it continues largely of its own momentum, all the while creating new grounds for fear and recrimination. In practice, it is impossible in every case to separate all these different factors and determine their relative importance.

"54. One of the most basic problems underlying the arms race has been ineffective implementation and use of the system of collective security envisaged in the Charter of the United Nations. Member States have the inherent right of individual or collective self-defence until the necessary international measures can be brought to bear on the situation, but in the absence of an effective guarantee of their security nations have sought security in their own military forces or in those of allies."

I. DYNAMICS OF THE NUCLEAR-ARMS RACE

Development of the nuclear-arms race

9. The nuclear-arms race is a process which involves more than a sum total of military expenditure and an updated list of major weapon systems of its participants. Along with its technological thrust, it encompasses inertial and action-reaction features, a drive for innovation and the centrality of the nuclear threat itself. 1/

10. Forty-five years ago there were no nuclear weapons. Today there are indications that there may be over 55,000 nuclear warheads deployed worldwide, on the territories of nuclear-weapon and certain non-nuclear-weapon States, as well as on the high seas. Among the five nuclear-weapon States, the United States of America and the Union of the Soviet Socialist Republics possess by far the largest arsenals of nuclear weapons and the most advanced delivery systems. The total explosive power of today's nuclear arsenals has been described as equivalent to about 1 million times that of the atomic bomb which destroyed Hiroshima in 1945, that is to say, some 15 billion tons of TNT, or about 3 tons for every human being on earth. The largest nuclear weapon ever tested was approximately 4,000 times as powerful as the Hiroshima bomb and in theory there is no upper limit to the explosive yield that may be attained.

11. In the 1950s and early 1960s, the nuclear-arms race was characterized by the development of ever more powerful weapons. The original atomic or fission bomb was followed by the more potent hydrogen or thermonuclear fusion bomb. Technological advances made it possible for one nuclear weapon to release in one microsecond more energy than the total amount released from all conventional weapons in all wars of history. Since the early 1960s, the trend has been towards more compact weapons, but even if their yield may nominally be less than that of older larger devices, technological advances have actually increased their war-fighting capabilities. An additional factor, in this regard, is the increased accuracy of the delivery vehicles. There is also an ongoing process of development of low-yield nuclear weapons and even "mini-nukes", as well as "enhanced radiation" weapons, so-called "neutron bomb" and "reduced residual-radiation" or "minimum residual-radiation".

12. Improvements in the delivery systems of nuclear weapons have had a far greater impact upon the qualitative improvements than have the breakthroughs in the design of warheads themselves. As an example of the improved quality of nuclear-weapon systems, one may point to the guidance system of the intercontinental ballistic missiles (ICBMs), the accuracy of which, over the last 30 years, has been enhanced, in terms of the circular error probable (CEP), from several kilometres to less than 200 metres.

13. Improvements in the quality and accuracy of nuclear-weapon systems would be virtually impossible without the testing of nuclear weapons and their delivery vehicles. Among other things, nuclear-weapon tests have helped to enhance yield-to-weight ratios and the so-called "tailoring" of weapon effects to specific military needs. Similarly, the present-day accuracy of the delivery systems could not have been attained without the flight-testing of missiles and re-entry vehicles. There has been no downward trend in nuclear testing since the Treaty Banning Nuclear Weapons Tests in the Atmosphere, in Outer Space and under Water (partial test-ban Treaty) was signed in 1963. On the contrary, the rate of testing has generally increased, although there was a significant drop in the number of tests conducted in 1985 and 1986, due to the Soviet moratorium on all nuclear test explosions. 2/

14. The dynamics of the nuclear-arms race are demonstrated by the seemingly endless drive to produce more varied, accurate and effective nuclear-weapon systems. A step towards the further sophistication of nuclear arsenals on one side is followed by similar efforts on the other. This pattern of action and reaction has been apparent since the very beginning of the nuclear age. Doctrines and technology are in a mutually re-enforcing relationship.

15. Underlying today's doctrines is the classical military notion of deterrence, i.e. the threat to use force to prevent the other side from carrying out hostile acts. The difference today is that we are in the presence not only of conventional weapons, but also of nuclear weapons whose effects can be immediate, total and global, i.e. which are capable of bringing destruction to any part of this planet. The recent United Nations Study on the Climatic and Other Global Effects of Nuclear War (1988) notes in one of its major conclusions that the scientific evidence is now conclusive that a major nuclear war would entail the high risk of a global environmental disruption (para. 22).

16. In another recent United Nations study, Study on Deterrence (1986), experts from Western, socialist and non-aligned States evaluated the concept of deterrence as a component of the military doctrines. According to the experts from the NATO countries, military deterrence, in the most general sense, is the dissuasion of one adversary by another from undertaking hostile military action by convincing him that such an action would be unsuccessful or too costly, since it would incur military counteraction. The West relies not only on punitive or nuclear deterrence, but also, and very importantly, on conventional denial deterrence and on a range of non-military as well as military deterrents. Beyond that, the West has always emphasized the political context of deterrence: Western strategy is predicated upon both the prevention of war by deterrence and credible defence and the pursuit of a political dialogue aiming at a more stable and co-operative East-West relationship. What is distinctive about deterrence in the nuclear age is that the overt use of nuclear weapons by either of the principal nuclear States against the other would almost certainly result in enormous damage to both and, perhaps, in an ecological catastrophe for civilization. 3/

17. According to the Western experts participating in the study, Western deterrence is entirely defensive politically and prohibits military offensive action. It rejects a first-strike strategy and proscribes strikes against population centres, regards parity of second-strike capabilities rather than superiority as the principal measure of strategic sufficiency; stresses crisis stability, based on the mutual incapacity of East and West for a rational first strike, as the basic requirement of mutual deterrence; disavows a war-winning strategy; and plans as carefully as possible to limit the use of force, including nuclear force, so as to hold open the option of rational war-termination through intra-war deterrence. 4/

18. The Declaration of the Heads of State and Government participating in the meeting of the North Atlantic Council in Brussels on 29-30 May 1989, contains the following passage:

> "12. For the foreseeable future, there is no alternative to the Alliance strategy for the prevention of war. This is a strategy of deterrence based upon an appropriate mix of adequate and effective nuclear and conventional forces which will continue to be kept up to date where necessary. We shall ensure the viability and credibility of these forces, while maintaining them at the lowest possible level consistent with our security requirements."

The report entitled A Comprehensive Concept of Arms Control and Disarmament, adopted at the same meeting, noted that the NATO member States were committed to maintaining only the minimum level of forces necessary for their strategy of deterrence, taking into account the threat. According to the report, there was a level of forces, both nuclear and conventional, below which the credibility of deterrence could not be maintained. In particular, the NATO member States had always recognized that the removal of all nuclear weapons from Europe would critically undermine deterrence strategy and impair the security of NATO. 5/

19. In the Study on Deterrence, the experts from the Warsaw Treaty countries underlined that the States parties to the Warsaw Treaty do not base their foreign policy or their security on concepts of nuclear deterrence. The essence of their security policy lies in the prevention of war by political

means and peaceful and mutually beneficial relations with all States irrespective of their social systems. In their view, the concept of nuclear "deterrence" came into being and has been formulated, developed and implemented by the United States and its allies essentially in the course of the post-war period. In the view of the Warsaw Treaty countries, there are different schools of thought behind the general doctrine of deterrence, but all of them are characterized by the drive for military superiority, instigating a nuclear or other arms race and increasing the threat of war. Contrary to its allegedly defensive character, the essence of the doctrine of nuclear deterrence is imposition of one's own will on other States through recourse to a policy of strength - the superior might of nuclear weaponry, combined with other modern means of destruction, and the threat of inflicting incalculable damage for political purposes. To this end, States following this doctrine try to upset the existing military equilibrium to make "credible" the threat of use of their military force. The understanding that a nuclear war can have no winners has not led to the abandonment of that concept and the related weapons programmes by their authors. 6/

20. The very fact that the Warsaw Treaty Organization possesses a powerful defence will inevitably be perceived by its opponents as a deterrent. The socialist experts stressed that the military equilibrium under current circumstances is a peace-preserving factor. The Soviet Union and other members of the Warsaw Treaty Organization have based their military strategy and tactics on the conviction that there will be no winners in a nuclear war and that any military conflict can potentially lead to nuclear war. Forced to maintain their military capability at the necessary level, the States parties to the Warsaw Treaty strongly oppose any further growth in the stockpiles of weaponry, especially nuclear weapons. 7/

21. The communiqué adopted by the Political Consultative Committee of the States Parties to the Warsaw Treaty at its session in Berlin on 28 and 29 May 1987 called for a new approach to the issues of war and peace, disarmament and other complex global and regional problems, and for the abandonment of the concept of "nuclear deterrence". According to the communiqué,

> "In a nuclear war, there can be no winners. For this reason, the States parties to the Warsaw Treaty reaffirmed their belief that the overriding task is to prevent war, to banish it permanently from civilization, to preserve peace on earth, to put an end to the arms race and to move towards concrete measures of disarmament, primarily in the nuclear field, with the aim of achieving complete and general disarmament." 8/

In the document entitled On the Military Doctrine of the States Parties to the Warsaw Treaty, adopted at the same meeting, it is further noted that that doctrine was subordinated to the task of preventing war, whether nuclear or conventional. The doctrine was strictly defensive in nature and was based on the concept that under present-day conditions recourse to military means to resolve any dispute was inadmissible. The States parties to the Warsaw Treaty would never be the first to employ nuclear weapons. 9/ The communiqué of the Meeting of the Political Consultative Committee of the States Parties to the Warsaw Treaty, held in Bucharest on 7 and 8 July 1989, noted that stability presupposed a rejection of confrontational doctrines and reliance on force, and the inadmissibility of direct or indirect interference in the internal

affairs of other States. It, furthermore, stated the position that the nuclear deterrence strategy remained a dangerous anachronism which runs counter to the interest of common security. 10/ At the Summit Meeting in Moscow, the Warsaw Treaty Member States declared that modern development in Europe creates conditions for overcoming a bloc security model and the division of the Continent. Furthermore, they called for the formation of a new all-European security system and the creation of a single Europe of peace and co-operation.

22. In the view of the experts from the non-aligned countries who participated in the Study on Deterrence, deterrence constitutes dissuasion of one adversary by another from undertaking hostile action - military or otherwise - by persuading him that such an action would risk being unsuccessful or too costly. Nuclear deterrence as practised between the nuclear-weapon Powers is different from other forms of deterrence, since in that case both the aggressor and the victim of the aggression are bound to suffer unacceptable levels of damage, irrespective of the decisions on the battlefield. 11/

23. In the non-aligned view as expressed by the experts, while there is no doubt that nuclear weapons have contributed to deterrence, it is difficult to prove that nuclear weapons are the sole factor in the exercise of deterrence. They also pointed out that the arms races of the prenuclear era inevitably ended in wars and the resolution of the question of the hierarchy of power. In the nuclear era, such a resolution through war is ruled out. Deterrence calls for a visible adversary to be deterred and nuclear deterrence has resulted in a situation where the dominant Power can express its superior status only through a build-up of weaponry, deployment of its forces worldwide and exercise of coercive diplomacy all over the world. The experts from the non-aligned countries argued that the vicious circle of nuclear deterrence and adversarial political relationship has to be broken. They listed three major approaches to restructuring deterrence: (a) nuclear deterrence will continue, but nuclear weapons will be made impotent and obsolete by defence-dominant technologies; (b) nuclear weapons will be eliminated in a phased manner, but deterrence based on non-nuclear factors will continue; and (c) nuclear weapons will be outlawed. 12/

24. In 1984, the leaders of Argentina, Greece, India, Mexico, Sweden and Tanzania called on the five nuclear-weapon States to halt all testing, production and deployment of nuclear weapons and their delivery systems (the Six-Nation Initiative) to be immediately followed by substantial reductions in nuclear forces and, subsequently, by a continuing programme of arms reductions leading to general and complete disarmament. They pledged to do everything in their power to facilitate agreements among the nuclear-weapon States. 13/ This statement was the first of a number of declarations and messages that have been addressed by the six leaders to the international community at large and to the leaders of the United States and the Soviet Union in particular on the subject of nuclear arms reductions and related issues.

25. In the Final Communiqué of the special ministerial meeting devoted to disarmament issues of the Co-ordinating Bureau of the Movement of Non-Aligned Countries, held at Havana from 26 to 30 May 1988, it was stated that the nuclear danger had not been eliminated, but at the same time the existing international atmosphere was favourable to progress towards the goal of total elimination of nuclear weapons. In the nuclear age, the security of nations

depended less and less on arms superiority. Nuclear weapons were instruments of annihilation rather than means of war; therefore, stockpiling such weapons was a threat to the survival of mankind. It was necessary for nuclear-weapon States to negotiate an agreement on the prohibition of the use or threat of use of nuclear weapons and to pledge not to be the first to use them. It was urged that non-nuclear-weapon States be given assurances against the threat or use of nuclear weapons by any nuclear-weapon State. 14/

26. In the Final Documents of the Ninth Conference of Heads of State or Government of the Movement of Non-Aligned Countries, held in Belgrade from 4 to 7 September 1989, it was stressed that current conditions were more favourable for disarmament. The USSR-United States summits had had a positive effect on world developments as a whole. The conclusion of the INF Treaty was welcomed and the expectation expressed that it would be a precursor to the adoption of concrete disarmament measures leading to the complete elimination of nuclear weapons. It was noted, however, that even if the current goals in East-West negotiations were achieved, the two blocs would retain significant nuclear and conventional arsenals. The urgency of adopting measures for achieving nuclear disarmament through a time-bound programme for the complete elimination of nuclear weapons was emphasized. 15/

Nuclear arsenals of the five nuclear-weapon States

27. There are numerous official and unofficial publications which estimate either the strategic nuclear capability of one or both major nuclear-weapon States or of all the nuclear-weapon States, but the relevant data do not necessarily coincide. A recent estimate */ of the strategic nuclear-weapon capabilities of the United States and the Soviet Union in 1989 is given in the annexed tables 1 and 2 below. 16/

28. In addition to these central strategic forces, the two major Powers have many weapon systems of shorter range. These systems (and similar weapons belonging to other nuclear-weapon States) are referred to as intermediate/medium-range forces or, in a European context, as "Eurostrategic" weapons. All these nuclear forces are included in the concept of theatre nuclear forces, more recently also called non-strategic nuclear forces, by which are meant nuclear weapons with ranges of up to and including 5,500 kilometres. A recent estimate */ of the theatre nuclear forces of the United States and the Soviet Union and the nuclear forces of the United Kingdom, France and China in 1989 is given in the annexed tables 3, 4, 5, 6 and 7 below. 17/

The INF Treaty

29. While the total number of nuclear warheads in the world continues to be high, in the past few years there have been major developments and efforts, which, if successfully pursued, will lead to significant reductions in nuclear-weapon stockpiles. Negotiations on intermediate/medium-range nuclear forces (INF) were held between the United States and the Soviet Union, at

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*/ This estimate is unofficial and the data contained therein are not necessarily accepted by the parties concerned. The annexing of this estimate does not in any way mean its endorsement by the United Nations.

various times, from 1981 to 1987. Those negotiations resulted in the Treaty between the United States of America and the Union of Soviet Socialist Republics on the Elimination of their Intermediate-Range and Shorter-Range Missiles (the INF Treaty), signed in Washington, D.C., on 8 December 1987. It consists of a preamble and 17 articles. It also includes a Protocol on procedures governing the elimination of the missile systems subject to the Treaty and a Protocol regarding inspections relating to the Treaty, as well as a Memorandum of Understanding on data, giving the locations, numbers and characteristics of each side's intermediate- and shorter-range missiles. The two Protocols and the Memorandum form an integral part of the Treaty. In the preamble, the parties express their conviction that the measures set forth in the Treaty will help to reduce the risk of outbreak of war, and they recall their obligations under article VI of the Nuclear Non-Proliferation Treaty.

30. The basic obligations of the two parties are embodied in article I. In accordance with the provisions of the Treaty, each party shall eliminate its intermediate-range and shorter-range missiles, not have such systems thereafter, and carry out the other obligations set forth in the Treaty. (According to the Protocol on Elimination, prior to the destruction of missiles, the nuclear warheads may be removed.)

31. Article II provides definitions of the key terms of the Treaty. For the purpose of the Treaty, the existing types of United States and Soviet intermediate-range and shorter-range missiles are identified in article III by the designations used by both the United States and the Soviet Union for the various missiles.

32. Article IV provides that each party shall eliminate all its intermediate-range missiles and their launchers, as well as all support structures and support equipment of the categories listed in the Memorandum of Understanding associated with such missiles and launchers, so that no later than three years after the entry into force of the Treaty and thereafter no such missiles, launchers, support structures or support equipment shall be possessed by either party. In accordance with the article, the elimination will take place in two phases.

33. Article V establishes that the elimination of shorter-range missiles will be completed not later than 18 months after the Treaty's entry into force. Article VI sets forth the obligations of the parties upon the Treaty's entry into force and thereafter not to produce or flight-test any intermediate- or shorter-range missiles. Articles VII and VIII provide detailed criteria and rules relating to the "counting rules" and locational restrictions. Article IX spells out obligations of the parties with regard to (a) the updating of the categories of data contained in the Memorandum of Understanding and (b) notifications.

34. Article X states in its first paragraph that each party shall eliminate its intermediate-range and shorter-range missiles and their launchers and support structures and support equipment associated with such missiles and launchers in accordance with the procedures set forth in the Protocol on Elimination. In subsequent paragraphs, it establishes general rules on elimination, notification and verification.

35. Articles XI to XIII define the rights and duties of the parties for the purpose of ensuring verification of compliance with the provisions of the Treaty. For such a purpose, article XI states, each party shall have the right to conduct on-site inspections, and the parties shall implement on-site inspections in accordance with the provisions of article XI itself, the Protocol on Inspection and the Protocol on Elimination. Each party shall have the right to conduct inspections for 13 years after the entry into force of the Treaty, both within the territory of the other party and within the territories of basing countries. Each party shall have the right to conduct 20 such inspections per calendar year during the first three years after entry into force of the Treaty, 15 such inspections per calendar year during the subsequent five years, and 10 such inspections per calendar year during the last five years. Neither party shall use more than half of its total number of inspections per calendar year within the territory of any one basing country. Each party shall conduct inspections of the process of elimination, including elimination of intermediate-range missiles by means of launching, of intermediate-range and shorter-range missiles and launchers of such missiles and support equipment associated with such missiles and launchers carried out at elimination facilities in accordance with article X of the Treaty and the Protocol on Elimination. Inspectors conducting inspections shall determine that the processes specified for the elimination of the missiles, launchers and support equipment have been completed.

36. Five different types of inspections are provided for under Article XI of the Treaty: (a) Baseline inspections were conducted between 30 and 90 days after the Treaty entered into force for the purpose of helping to verify the updated data exchanged by the Parties; (b) close-out inspections help to verify that all INF-related activities have ceased and that no INF systems remain at INF facilities which have been scheduled for elimination; (c) each side also has the right to conduct short-notice inspections of all missile operating bases and all missile support facilities listed in the Memorandum of Understanding, except missile production facilities, for 13 years after the Treaty entered into force. These inspections help to confirm the numbers of missiles, launchers, support structures and support equipment located at each base or facility at the time of inspection and to confirm that no Treaty-prohibited INF activities are carried out there; (d) elimination inspections help to confirm that Treaty-limited items are eliminated in accordance with the procedures specified in the Elimination Protocol. Such inspections are the only inspections that each party is obliged to conduct; (e) finally, both Parties have the right to inspect by means of continuous monitoring the portal of one of the other Party's missile production facilities.

37. In article XII, the Treaty provides that, for the purpose of ensuring verification of compliance, each party shall use national technical means of verification at its disposal in a manner consistent with generally recognized principles of international law. Article XIII establishes a special verification commission to resolve questions relating to compliance with the obligations assumed and to agree upon such measures as might be necessary to improve the viability and effectiveness of the Treaty. Article XIV provides that the parties shall comply with the Treaty and not assume any international obligations or understandings which would conflict with its provisions.

38. Article XV provides that the Treaty shall be of unlimited duration. However, each party shall, in exercising its national sovereignty, have the right to withdraw from the Treaty if it decides that extraordinary events related to the subject-matter of the Treaty have jeopardized its supreme interests. It shall give notice of its decision to withdraw to the other party six months prior to withdrawal from the Treaty. Such notice shall include a statement of the extraordinary events the notifying party regards as having jeopardized its supreme interests. Articles XVI and XVII deal, respectively, with amendments and the Treaty's entry into force.

39. The INF Treaty is an unprecedented agreement in terms of both scope and provisions. Under it, an entire class of weapons is being eliminated from the arsenals of the two major Powers and the process is being carried out in accordance with stringent verification provisions. The Soviet Union, the United States and other States believe that the Treaty could have a positive impact not only on the relations between the two parties, but also on the security of the whole world. The conclusion of the Treaty has also been welcomed in the hope that it will enhance international stability and have a positive influence on other ongoing disarmament negotiations, multilateral as well as bilateral. The parties themselves recognize that the Treaty is just a beginning and that much remains to be done in the field of nuclear disarmament.

40. On 27 May 1988, the United States Senate approved the resolution on ratification of the INF Treaty. The following day, the Presidium of the Supreme Soviet ratified the Treaty. On 1 June, at the Moscow Summit, President Reagan and General Secretary Gorbachev exchanged the instruments of ratification. The two leaders, welcoming the entry into force of that historic agreement, expressed their determination to achieve the full implementation of all the provisions and undertakings of the Treaty, viewing their joint and successful work in that respect as an important precedent for future efforts in arms limitation. The Treaty, they stated, set new standards for arms control. With its entry into force, the process for the actual elimination of some 2,500 intermediate-range and shorter-range missiles of the two major Powers was officially started, in accordance with the provisions of the Treaty.

41. During the first part of the 1988 session of the Conference on Disarmament, the United States and the USSR submitted to the Conference the text of the INF Treaty, together with the two Protocols and Memorandum that are integral parts of the Treaty itself. While those documents were welcomed by members of the Conference, the hope was expressed for a further development, namely early conclusion of the treaty on a 50 per cent reduction in the strategic offensive arms of the two major Powers.

42. Five Western European countries - the United Kingdom, Italy, Belgium, the Netherlands and the Federal Republic of Germany - have contributed to the implementation of the INF Treaty. They concluded the Basing Country Agreement of 11 December 1987, which created the legal framework enabling the United States to fulfil its obligations towards the Soviet Union by permitting Soviet inspections on American INF bases on the territories of those countries. They also exchanged notes with the Soviet Union, in which each basing country gave its consent to the implementation of inspection measures in which the Soviet Union in return gave the assurance that it would strictly adhere to the provisions of the Inspection protocol while carrying out inspection activities.

43. With regard to the Pershing I A missiles of the Federal Republic of Germany, on 26 August 1987 Chancellor Helmut Kohl made the following decision: (a) If the United States and the Soviet Union reached agreement on worldwide elimination of all INF missiles and if especially the outstanding verification issues were resolved to the satisfaction of everyone concerned; (b) if the INF Treaty was ratified by the contracting Parties and entered into force; (c) if, finally, the contracting Parties adhered to the agreed timetable for the elimination of their weapon systems; then the Pershing I A missiles would not be modernized, but could be dismantled upon the final elimination of all Soviet and American INF missiles.

44. Two States Parties to the Warsaw Treaty - Czechoslovakia and the German Democratic Republic - have also contributed to the implementation of the INF Treaty. As a gesture of goodwill and on the basis of consultations with the USSR, they agreed to the withdrawal of Soviet OTR-22 missiles from their territory even before the entry into force of the INF Treaty. For that purpose, they also agreed with the carrying out of on-site inspections on their territory. Since the conclusion of the trilateral Basing Country Agreement between the USSR, Czechoslovakia and the German Democratic Republic on 11 December 1987, that agreement constitutes the legal framework for the inspections undertaken by American inspectors.

45. As at 12 February 1990 missiles and launchers eliminated were as follows:

Soviet Union

	Declared		Eliminated	
	missiles	(launchers)	missiles	(launchers)
SS-20/RSD-10	654	(509)	384	(280)
SS-12/OTR-22	718	(132)	718	(132)
SS-23/OTR-23	239	(106)	239	(106)
SS-4/R-12	149	(72)	124	(57)
SS-5/R-14	6		6	
SS-CX-4/RK-55	80	(6)	80	(6)

United States

	Declared		Eliminated	
	missiles	(launchers)	missiles	(launchers)
P-IA	169	(1)	169	(1)
P-II	234	(165)	74	(55)
GLCM	443	(173)	220	(51)

Source: United States On-Site Inspection Agency, Washington, D.C., USA.

Negotiations on strategic nuclear weapons

46. On 7-8 January 1985, the United States and the Soviet Union agreed to conduct negotiations covering a range of issues concerning nuclear and space arms - both strategic and intermediate-range - which would be dealt with in their interrelationship. The objective of the negotiations would be "to work

out effective agreements aimed at preventing an arms race in space and terminating it on Earth, at limiting and reducing nuclear arms, and at strengthening strategic stability". 18/ These umbrella talks would include negotiations aiming at the reduction and eventual elimination of strategic nuclear weapons (the START talks); they would also cover a group of space weapons and intermediate-range forces. Which weapons would be covered by a strategic arms reduction treaty has not yet been fully decided, although there is general understanding on this account between the parties.

47. Towards the end of the 1988 session of the Conference on Disarmament, the United States and the Soviet Union provided information on the status of the START talks. The United States summed up the situation as follows. In the strategic arms reduction talks, there was agreement in principle to reduce strategic forces by 50 per cent; to impose a ceiling of 6,000 warheads on 1,600 strategic nuclear delivery vehicles; and to create subceilings of 4,900 ballistic missile warheads, and of 1,540 warheads on 154 heavy missiles. The sides had also agreed to a 50 per cent reduction in the throw-weight of Soviet missiles. In addition, agreement had been reached on a counting rule for the armaments borne by heavy bombers. Agreement existed on certain verification measures including several kinds of on-site inspection, data exchange, and measures to reduce the possibility of cheating. This progress had been recorded in a joint draft treaty text, which also set out the remaining areas of disagreement. At the Moscow summit, some common ground had been identified with respect to the problem of verification of mobile missiles - should they be permitted in a strategic arms reduction treaty - and with respect to air-launched cruise missiles. In the forum dealing with defence and space issues, the objective of the United States was to seek agreement on how it would, jointly with the Soviet Union, manage a stable transition to increased reliance on effective defences that threatened no one. A separate agreement on these issues was being worked on, which reflected the principles which President Reagan and General Secretary Gorbachev had outlined at the Washington summit, in December 1987. In addition, work was continuing on a draft protocol designed to improve predictability as research was carried out in the strategic defence area and preparations made for a possible transition to greater reliance on defences. 19/

48. The Soviet Union provided additional information on the subject, as follows. The joint draft treaty reflected the earlier understanding on establishing ceilings of no more than 1,600 strategic delivery systems and 6,000 warheads, as well as agreement on subceilings of 4,900 in the aggregate of ICBM and SLBM warheads and of 1,540 warheads on 154 heavy missiles. The draft treaty also recorded agreement between the parties that, as a result of the reductions, the aggregate throw-weight of the Soviet Union's ICBMs and SLBMs would be brought down to approximately 50 per cent of the existing level. Agreement had also been reached on a rule that heavy bombers equipped only for nuclear gravity bombs and short-range missiles would count as one delivery vehicle against the 1,600 limit and one warhead against the 6,000 limit. This counting rule, which had been agreed at the Reykjavik meeting of the leaders of the two Powers, would apply if the 600 kilometre threshold, also agreed before, was used to divide air-to-surface missiles into long-range and shorter-range missiles. The Soviet Union noted that the draft of the protocol on inspections, the protocol on conversion or elimination and the memorandum of understanding, which were

integral parts of the treaty, built on the verification provisions of the INF Treaty, extending and refining them as necessary to meet the more demanding requirements of the treaty on the reduction of strategic offensive arms. The verification measures would include as a minimum such items as the exchange and updating of data, baseline inspections, on-site observation of the elimination of relevant systems, and continuous on-site monitoring of the perimeter and portals of critical production facilities to confirm the output of weapons to be limited, etc. It was of great significance for the positive development of the negotiations, the Soviet Union added, that the joint statement adopted at the end of the Moscow summit meeting of 1988 reaffirmed the language on issues concerning the Treaty between the United States and the Union of Soviet Socialist Republics on the Limitation of Anti-Ballistic Missile Systems (ABM Treaty) of 1972, which had been agreed at the Washington summit in December 1987. The Soviet and United States leaders had directed their representatives at the negotiations to prepare a joint draft of a separate agreement on space issues and to continue work on its associated protocol. As a result of the Moscow meeting, the parties had expressed their shared conviction that the extensive work done provided the basis for concluding a treaty on the reduction and limitation of strategic offensive arms which would promote strategic stability and strengthen security not only for the Soviet and American peoples, but for the whole of mankind. The parties had agreed to continue their efforts in this area energetically and purposefully. They had also reached an understanding in principle that, once the remaining problems had been solved and the treaty and its associated documents agreed, they would be signed without delay. Thus the Moscow summit gave both negotiating teams a joint mandate, drawing on the progress already achieved, to seek the early preparation of the treaty on 50 per cent reductions in strategic offensive weapons in strict compliance with the ABM Treaty. Progress at the negotiations, the Soviet Union stated, was now largely dependent on the resolution of such issues as compliance with and non-withdrawal from the ABM Treaty, and limitations on the deployment of long-range sea-launched cruise missiles. 20/

49. During the 1989 session of the Conference on Disarmament, the leading nuclear Powers continued to provide information on the status of the START talks. The Soviet Union noted that limitations on long-range SLCMs was one of the most complicated issues in the negotiations. The Soviet side based its position on the so-called Washington agreement laid down in December 1987, which provided for a mutually acceptable solution to the question of limiting the deployment of long-range nuclear-armed SLCMs. Although such limitations would not involve counting those SLCMs against the 6,000 limit on the number of warheads and 1,600 limit on strategic offensive arms delivery vehicles, the parties committed themselves to ceilings on such missiles and to a search for mutually acceptable and effective measures to verify compliance with such limitations that could include the use of national technical means, co-operative measures and on-site inspections. The Soviet side had submitted proposals concerning a set of measures which would ensure the necessary verification of long-range SLCMs. The discussions on counting rules for long-range ALCMs on heavy bombers had proved encouraging. In its view, the entire quantity of long-range ALCMs for which heavy bombers were actually equipped would be subject to counting. Regarding heavy ICBMs, the Soviet side had called for the broadest and most effective possible verification of compliance with limitations and prohibitions covering all types of strategic offensive arms that would be covered by the treaty. Work had also continued on drafts of the treaty, the data base memorandum, the inspections protocol and the protocol on the conversion or elimination of strategic offensive arms. 21/

50. The United States noted that the START negotiations had produced a joint text that reflected areas of agreement and disagreement. It reaffirmed the continued acceptance of the structure of limits and sublimits that had already been agreed: 1,600 strategic offensive delivery systems; 6,000 accountable warheads; 4,900 warheads of intercontinental ballistic missiles and submarine-launched ballistic missiles; 1,540 warheads on 154 heavy ballistic missiles; and a reduction of approximately 50 per cent in Soviet ballistic missiles throw-weight. While the United States reaffirmed its support of the basic numerical limits, it had reserved the right to suggest new ideas and other changes that it believed would contribute to force survivability and stability. Its position on banning mobile ICBMs remained unchanged: it had indicated, however, that it would be willing to reconsider it, if the sides could agree on a régime that would allow the effective verification of numerical limits on mobile ICBM systems. It had also proposed that a special effort be made to agree on, and begin implementing as soon as possible, certain verification and stability measures drawn from proposals previously advanced by both sides. In its view, the START agreement should be reached on a sublimit of between 3,000 and 3,300 warheads on deployed ICBMs. On heavy ballistic missiles, it held that the treaty should ban the production, flight-testing, or deployment of new or modernized types of heavy ICBMs, as well as the production or deployment of additional heavy ICBMs of existing types. Regarding bomber weapons, it continued to propose that ALCMs be counted under an attribution rule that would credit each heavy bomber equipped with ALCMs with an agreed number of warheads against the 6,000 limit, regardless of the number actually carried. 22/

51. United States Secretary of State Baker and Soviet Foreign Minister Shevardnadze met in Moscow 7-9 February, 1990. In their Ministerial Joint Statement of 10 February, it was stated, inter alia, that

> "... The Secretary and the Foreign Minister held a thorough exchange of views on arms control and disarmament issues. With respect to the treaty on the reduction and limitation of strategic offensive arms, they reaffirmed their common objective of resolving all major issues by the June summit in order to allow signature of the treaty by the end of the year. ..."

52. During the Washington Summit Meeting from 30 May to 4 June 1990, the President of the United States, George Bush, and the President of the USSR, Mikhail S. Gorbachev, discussed the status of the Treaty on the Reduction and Limitation of Strategic Offensive Arms. In a joint statement, the two Presidents expressed their satisfaction with the progress achieved so far. They welcomed the solutions which had been found on major issues and reaffirmed their determination to have the Treaty completed and ready for signature by the end of 1990. In accordance with the Treaty, both sides will carry out up to 50 per cent reduction in certain categories of strategic offensive arms. The agreed provisions of the Treaty include a reduction in the overall numbers of delivery vehicles (ICBMs, SLBMs, heavy bombers) to no more than 1,600 and of nuclear warheads to no more than 6,000. The aggregate throw-weight of the deployed ICBMs and SLBMs of each side will be limited to 50 per cent below the present level of the USSR. The reductions will be carried out in three phases over a period of seven years. The Treaty will also include specific prohibitions on certain categories of strategic offensive arms, basing modes and activities. The following are among the bans

under the START Treaty: new types of heavy ICBMs; heavy SLBMs and launchers of heavy SLBMs; mobile launchers of heavy ICBMs; new types of ICBMs and SLBMs with more than 10 re-entry vehicles; flight testing and deployment of existing types of ICBMs or SLBMs with a number of re-entry vehicles greater than the number specified in the Washington Summit Joint Statement of December 1987; rapid reload of ICBM launchers; long-range nuclear ALCMs equipped with multiple independently targetable warheads. Sea-launched cruise missiles (SLCMs) will not be constrained in the START Treaty. Each side will provide the other with unilateral, politically-binding declarations regarding its planned deployment of nuclear SLCMs with a range over 600 km. The maximum number of deployed SLCMs for each of the following five Treaty years will not exceed 880. The verification régime for the reductions and other constraints contained in the Treaty includes on-site inspections; national technical means of verification; a ban on denial of telemetric information; data-information exchange on numbers, locations and technical characteristics of strategic arms and an agreement on the manner of deployment of mobile ICBMs and limitations on their movements so as to ensure effective verification. A Joint Compliance and Inspection Commission will be established to promote the objectives of the Treaty. The Treaty will have a duration of 15 years and can be extended for successive five-year periods.

Reducing the risk of conflict

53. In the joint statement issued in Washington on 10 December 1987, following their signing of the INF Treaty, President Reagan and General Secretary Gorbachev affirmed the fundamental importance of their meetings at Geneva (1985) and Reykjavik (1986), which had laid the basis for concrete steps in a process intended "to improve strategic stability and reduce the risk of conflict". They also welcomed the signing on 15 September, in Washington, of the agreement to establish Nuclear Risk Reduction Centers in their respective capitals. The agreement, they stated, would be implemented promptly. The two leaders further recognized the special responsibility of the United States and the Soviet Union to search for realistic ways to prevent confrontations and to promote a more sustainable and stable relationship between their countries. To that end, they agreed to intensify dialogue and to encourage emerging trends towards constructive co-operation in all areas of their relations, in particular arms control - including nuclear and space talks, nuclear testing and nuclear non-proliferation. In the course of the 1988 session of the Conference on Disarmament, the Soviet Union and the United States presented to the Conference two documents closely related to the question of prevention of nuclear war, namely: (a) the text of the Agreement between the USSR and the United States on the Establishment of Nuclear Risk Reduction Centers, and of Protocol I and Protocol II to that Agreement, signed at Washington on 15 September 1987; and (b) the text of the Agreement between the USSR and the United States on Notifications of Launches of Intercontinental Ballistic Missiles and Submarine-Launched Ballistic Missiles, signed at Moscow on 31 May 1988. 23/

Tactical nuclear weapons and other developments

54. Tactical nuclear weapons comprise artillery shells, ground mobile rockets and missiles, air-launched bombs, rockets and missiles (with aircraft

operating from carriers as well as land-based) and atomic demolition munitions ("land-mines"). Ground-based systems have a range from about 15 km (artillery) to several hundreds of kilometres (heavy missiles). Yields may vary from less than 0.1 to more than 100 kt. 24/

55. The importance of the changes now under way in the field of nuclear armaments and their delivery vehicles is not only that their performance in missions traditionally assigned to them is improving year by year, but also that essentially new types of missions may become possible, for instance, in the case of "enhanced radiation" weapons or "neutron bombs". According to the United Nations Comprehensive Study on Nuclear Weapons, "both mini-nukes and neutron bombs can be seen as expressions of an effort to make nuclear weapons less destructive to the surroundings if they were to be used in actual warfare and thus, according to their proponents, make nuclear deterrence at the tactical level more credible" (para. 81). In view of "dangerous developments with respect to neutron weapons", the socialist States submitted proposals in the General Assembly and the Conference on Disarmament on the prohibition of the production, deployment and use of nuclear neutron weapons, including the conclusion of an international convention to that end (General Assembly resolution 40/152 H; CCD/559).

56. In another environment, as a result of recent rapid developments in the field of space technology, the dangers of an arms race in outer space are widely believed to have grown. An alternative view holds that prospects for development of effective defences against ballistic missiles have improved and deployment of such defences could eventually help reduce significantly the threat represented by these highly destructive and destabilizing offensive missiles. As already noted above, on 8 January 1985 the Soviet Union and the United States agreed to enter into new negotiations on a complex of questions covering space and nuclear weapons with the objective of working out agreements aimed, inter alia, at preventing an arms race in outer space (see also paras. 46-51 above).

57. The consequences of the latest developments in space technology could be both positive and negative. As suggested by the United Nations study Implications of Establishing an International Satellite Monitoring Agency (1981), space technology can be effectively used for verifying compliance with international agreements on arms limitation as well as for monitoring crisis areas at an annual cost of much less than 1 per cent of the current annual expenditure on the world-wide arms race. But, in a situation characterized by periods of exacerbated international tensions, potentially beneficial aspects of space technology remained unexplored.

58. All these new developments have been made possible by very large investments in applied research and military technology. According to the Comprehensive Study on Nuclear Weapons (para. 361), for instance, certain programmes have been funded by one Power just to ensure that the other might not gain an edge in the development of the technology in question. Once this technology has been developed, however, the temptation to apply it in the production of the relevant weapon has been difficult to resist, as each major Power felt that its national security depended heavily on a continuous upgrading of its weapons.

II. CONSEQUENCES OF THE NUCLEAR-ARMS RACE

59. As indicated in paragraph 2 above, the consequences of the nuclear-arms race are here examined with the help of United Nations studies and documents and of other sources within the United Nations framework. It should be noted that some of these reports and sources have not been supported by all Member States of the United Nations.

60. The primary United Nations source on the arms race and, in particular, on the nuclear-arms race, is the Final Document adopted by consensus by the General Assembly at its Tenth Special Session in 1978. In that Document (see also paras. 4 and 5 above), the General Assembly declared that enduring international peace and security could not be built on the accumulation of weaponry nor be sustained by a precarious balance of deterrence or doctrines of strategic superiority (para. 13). The Assembly further emphasized the growing danger of war, in particular nuclear war, and stated that removing the threat of a world war was the most acute and urgent task of the present day (para. 18).

61. The United Nations Comprehensive Study on Nuclear Weapons (1980) deals with many aspects concerning the nuclear-arms race, including the security implications of the continued accumulation and qualitative improvement of nuclear-weapon systems. The following paragraphs in the body of the study are particularly relevant.

> "354. The two super-Powers, the Soviet Union and the United States maintain the two largest nuclear-weapon arsenals in the world. They also possess very large conventional armed forces and are strong economic Powers with a large population, large industrialized capacity, advanced scientific and technological capability and significant natural resources. From the point of view of their national security, however, each considers the main threat to arise from the strategic nuclear-weapon systems of the other super-Power ... One concern has been the possibility that one of the super-Powers would attain nuclear superiority, notably in terms of a first-strike capability that could be used to eliminate the strategic weapons of the other. A second consideration pertains to the instability of the mutual deterrence situation: how political, technical or human mistakes could unleash a strategic exchange with vast consequences.
>
> "355. If one super-Power were to achieve 'nuclear superiority' in some meaningful and lasting sense (if that is possible), there would, in effect, be only one nuclear super-Power, with the consequences that this might have for international relations. It is therefore not surprising that neither seems confident that the other has eschewed the goal of superiority. Even when the two agree to avoid unequal capabilities, each considers that its national security depends on the continual improvements in the other's forces. At the same time, it would seem virtually impossible to attain nuclear superiority when the strategic forces are as numerous, dispersed and protected as at present. The argument is more forceful in the opposite direction: because of the vast numbers of strategic nuclear weapons in existence, it should be possible to undertake a major arms reduction without jeopardizing the national security of the two super-Powers.

"356. The same conclusion follows from a consideration of the stability of the nuclear deterrence situation: the more numerous the weapons, the more complex the systems and sophisticated the doctrines, the more likely it may be that the weapons may be used by mistake, be it a political, military, technical or human mistake. There is no foolproof system for the control of nuclear weapons. Various methods may be used to decrease risk of a mistake, but in spite of all efforts accidents have occurred involving nuclear weapons and they will continue to occur. This is a concrete threat to the national security of both super-Powers. Each is dependent on the 'nuclear stability' of the other. ...

"357. One further and most important aspect of the stability of the systems of mutual deterrence lies with the quality of the continuing nuclear arms race. There are several views as to the roots and causes of the arms race and each may highlight a particular aspect of the problem. In all these theories one must ask, however, what assurance do they provide that the underlying process of research and development will not yield military applications of a destabilizing nature? To put one's confidence in 'living with the nuclear arms race' may thus be an ominous investment for the future."

62. The conclusions of the study include the following:

"496. In the face of the enormity of the destruction that would be caused by a nuclear war, there must be a decisive concern with the stability of the global deterrence situation. The argument of the stability of the balance is one which gives the proponents of deterrence great difficulty. In order to claim that it is possible to continue, forever, to live with nuclear weapons, the balance must be maintained at all times irrespective of any technological challenges that may present themselves as a result of the arms race. In addition, there must be no accidents of a human or technical nature, which is an impossible requirement as shown by the various incidents of false alarms and computer malfunctioning that are reported from time to time. Sooner or later one of these incidents may give rise to a real accident with untold consequences ...

"497. Even if the balance of deterrence was an entirely stable phenomenon, there are strong moral and political arguments against a continued reliance on this balance. It is inadmissible that the prospect of the annihilation of human civilization is used by some States to promote their security. The future of mankind is then made hostage to the perceived security of a few nuclear-weapon States and most notably that of the two super-Powers. It is furthermore not acceptable to establish, for the indefinite future, a world system of nuclear-weapon States and non-nuclear-weapon States. This very system carries within it the seed of nuclear-weapon proliferation. In the long run, therefore, it is a system that contains the origins of its own destruction.

"498. There is the further fact that the doctrines of nuclear deterrence have to a certain extent developed in conjunction with technology and they have thus become increasingly sophisticated as the range of means available for their implementation has become wider, more complex and more diversified. Doctrines, in a sense, are fictions built upon various

hypothetical scenarios of nuclear war. Also for this reason, they have grown too complicated and sophisticated. This trend is undermining the credibility of the doctrines even among those who subscribe to the usefulness of nuclear weapons. It is therefore highly questionable whether the doctrines of deterrence would prove to be reliable instruments of control in a crisis. In any case, events do develop independently of the doctrines and no one can say with assurance that reality will unfold itself according to what may have been expected or in line with what was foreseen by virtue of the doctrines.

"499. In spite of all arguments, some countries have chosen to base their security perceptions on nuclear-weapon systems, in the hope that the balance of deterrence may remain stable. In particular, the super-Powers perceive that nuclear weapons support their national security both by deterring direct conflict between them and by increasing their influence in other areas of the world. At the same time, both are concerned that the other might achieve nuclear superiority. In the absence of verifiable measures of disarmament, these concerns are projected as justifying further quantitative increases and qualitative developments of their nuclear arsenals. But the doubtful stability of deterrence may well decrease as a result of the nuclear arms race, even if both sides have agreed to seek nuclear parity. It is therefore highly questionable whether the security of the nuclear-weapon States - however defined - can be maintained on the basis of an arms race.

"500. Nuclear weapons are the most serious threat to international security. One reason for this is that existing nuclear-weapon arsenals have acquired a role of their own in international relations. It is today possible that a grave accident or even a devastating war may be originated by the nuclear-weapon systems themselves, and the perceived threat they constitute against each other. This could be brought about, especially in a situation of high tension, by a pre-emptive strike or through an escalation from the conventional to the nuclear level.

"501. It is therefore important to recall that the General Assembly, at its tenth special session in 1978, declared that effective measures of nuclear disarmament and the prevention of nuclear war have the highest priority, and urged all nuclear-weapon States, in particular those among them which possess the most important nuclear arsenals, to implement the measures set out in the Final Document in achieving these objectives ..."

63. The questions concerning economic and social consequences of the arms race have been a subject of analyses in the United Nations since the late 1960s. The most recent study entitled Economic and Social Consequences of the Arms Race and of Military Expenditures (1988) 25/ stresses that military expenditures have extensive social and economic consequences. Economic effects are most pronounced in leading military spenders, and in particular in those areas of their economies which are dominated by modern science and technology, which is a key factor in the present arms race. The negative long-term consequences of military expenditures overshadow any positive short-term effects. Therefore, military expenditures, contributing to economic stagnation and structural dislocation, influence the economic and political future of main spenders and their mutual relations, shaped by competition for control over modern technologies. In the developing

countries, too, there exists a choice between the urgent need to stimulate economic development, on the one hand, and military spending on the other. The social and cultural consequences of the arms race are visible in every country involved in the arms race, affecting both the allocation of resources and the political atmosphere in their societies. The social effects are most deeply felt by the underprivileged, whose basic needs are not met because of the lack of adequate resources, some of which are absorbed by the arms race. There is a genuine trade-off between the allocation of national resources to military purposes and the ability to solve global social problems.

64. According to the study, 26/ the efforts to stop the arms race, in particular in its nuclear aspects, are a sign of the widespread pursuit of a more secure and liveable world. This desire for a world in which military force would be effectively constrained was stressed in the Final Document of the first special session of the General Assembly devoted to disarmament, held in 1978:

> "The ending of the arms race and the achievement of real disarmament are tasks of primary importance and urgency. To meet this historic challenge is in the political and economic interests of all nations and peoples of the world as well as in the interest of ensuring their genuine security and peaceful future." (para. 1)

To achieve these objectives, States and their political leaders should consider taking effective action to curb the arms race and start real disarmament both by bilateral and multilateral agreements and by national measures of self-restraint. A long-term perspective should also include determined action aimed at the cessation, through negotiations, of the applications of technological innovations which sustain the arms race.

65. A main conclusion of the study is as follows:

> "188. The arms race continues to have a divisive effect on the world, furnishing the means for transgression of the fundamental provisions of the United Nations Charter and undermining international security and conditions for the international co-operation which is urgently required in all the relevant fields underlined by this report. In this sense, the fulfilment in good faith of the principles of the Charter is both essential and complementary to the process of disarmament and the further release of resources for the needs of development. All these joint efforts are indispensable to reinforce and consolidate collective security, the principles of which are fundamental and irreplaceable instruments established by the Charter for the preservation of international peace and security."

66. In addition, the study entitled The Relationship between Disarmament and Development 27/ has emphatically stressed that the arms race and development are in a competitive relationship not only in terms of their respective claims on the world's finite resources, but also as regards attitudes and perceptions. Taking a global perspective, this study views development as a universal requirement including the need for sustained and stimulated economic growth for the developed countries and accelerated socio-economic performance by the developing countries. By viewing the arms race as a major threat to international security and by describing arrested or stagnant development as

a non-military source of insecurity, a triangular relationship between disarmament, security and development has been established. To pre-empt the world's finite resources from being claimed for military consumption, to convert the resources already so consumed to non-military purposes, and to divert them towards socio-economic development are the essential requisites for a strategy for disarmament. From a global perspective, these are also major prerequisites for the speedy establishment of a new international economic order which, as described earlier, is another way of coming to terms with international economic realities. Particularly rewarding in this context would be a further exploration of the benefits which would accrue from major measures of disarmament, whether these pertain to reductions in military budgets, redeployment of capital from the military to the civilian sectors of economy or to a diversion of a part of the huge global military R and D effort towards developing appropriate technologies of economic relevance to the developing countries. The International Labour Organisation estimates that the total number of people in military-related employment worldwide varies in the range of 60 million to 80 million, of whom some 8 million to 10 million are production workers. 28/

67. At the Fifteenth Special Session of the General Assembly, held in 1988, different views were expressed on the role and place of nuclear weapons in connection with the security of States, the causes of the nuclear-arms race, the theory of deterrence and other related issues.

68. Foreign Minister Shevardnadze of the Soviet Union (A/S-15/PV.12) reaffirmed his Government's proposal for a step-by-step elimination of nuclear weapons by the year 2000 and advocated a new platform of disarmament in the years following the beginning of the physical elimination of nuclear weapons. In his view, the world community was witnessing a realistic prospect of the removal of 13,000 nuclear warheads from weapons arsenals. He was confident that an agreement on a 50 per cent reduction in strategic offensive arms, while observing the Anti-Ballistic Missile Treaty (ABM), would be concluded. He considered that the search for and the devising of other political methods, the purpose of which would be to build a nuclear-free world, was now the order of the day. His Government's other objectives were to expand and intensify the process of disarmament without losing momentum and to build security on a different qualitative level. This was not to say that nuclear weapons could be eliminated easily or regardless of other elements of security, but the first and perhaps the hardest thing to do was to abandon the myth of nuclear weapons as the guarantor of peace. This "guarantor" was capable of reducing all life on the planet to ashes; so long as those weapons existed, mankind lived in constant fear. The nuclear component of strategy was the most aggressive catalyst of the arms race, which was why it must be done away with. The Soviet Union was convinced that ensuring security by non-nuclear means was possible on the basis of sufficiency, which implied a psychological and political disposition towards ever smaller arsenals, sufficient for defence but not for attack, and supportive of an institution such as the United Nations, which could be the central focus of a comprehensive system of international peace and security.

69. Secretary of State Shultz of the United States (A/S-15/PV.19) stressed that progress in United States-Soviet arms control had been substantial, as evidenced by the INF Treaty. He believed that that Treaty's breakthroughs in verification and openness would be considered by future historians to have

been almost as important as the nuclear reductions themselves. In addition, major progress towards a treaty to cut United States and Soviet strategic nuclear arsenals by 50 per cent had been made and its conclusion was the top arms control priority of the United States. Earlier in 1988 nuclear risk reduction centres had been opened in Moscow and Washington; they would further decrease the chance of war through accident or miscalculation and would play a direct role in implementing the INF Treaty. The two Powers had also agreed to provide 24 hours' advance notice of strategic ballistic-missile launches. He further noted that since June 1982, 21 additional States had joined what he considered the most important multilateral disarmament agreement so far achieved - the nuclear non-proliferation Treaty, and that the 1985 third Review Conference of the Treaty had unanimously concluded that the Treaty was essential to international peace and security. In 1987, the United States and six other industrialized democracies had formed a missile technology control régime to limit the proliferation of missiles capable of delivering nuclear weapons; during the 1988 Moscow summit meeting the United States and the Soviet Union had agreed to hold exploratory talks to exchange ideas and information about how to cope with that growing problem. As a welcome contribution of the United Nations to essential principles of arms control, he mentioned consensus resolutions adopted by the General Assembly calling for compliance with existing treaties and resolutions underlining the importance of verification of arms-control agreements.

70. China (A/S-15/PV.4) stated that in their negotiations on disarmament the two super-Powers had paid great attention to "balance" and "equal security" between themselves. The question, however, was whether this would indeed ensure security for the other countries. It was China's view that the military imbalance between the two major Powers and the rest of the world made the vast majority of countries feel extremely insecure. Furthermore, the arms race was still going on, with the important change that there was quantitative reduction but qualitative improvement. Long-range cruise missiles had emerged as a new strategic nuclear force and were in the process of further development. Strategic nuclear weapons were being improved in respect of accuracy, mobility and stealth; so were tactical nuclear weapons. With the development of space weapons, outer space would become an area for the arms race between the two super-Powers. The existing situation of world armaments determined that the two super-Powers bore a special responsibility for disarmament and that they should take the lead in drastically reducing their respective armaments; their signing of the INF Treaty was a first step in that direction. However, only by persisting in that approach could further concrete results be achieved in the cause of disarmament. The two super-Powers should take the lead in putting an end to the testing, manufacture and deployment of all types of nuclear weapons and in drastically reducing and eliminating all the types of nuclear weapons that each of them had deployed. Then, a broadly representative international conference on nuclear disarmament could be convened with the participation of all nuclear States to discuss the steps and measures to be taken for a thorough destruction of nuclear armaments.

71. France (A/S-15/PV.4) welcomed the progress achieved in the dialogue between the two major Powers and at the regional level. It held, however, that the international community could not be satisfied with the role of a more or less passive observer. The community must, instead, play its role to the full in the task of disarmament; to do so, what was required was first of

all realism. One must therefore steer clear of themes which would never secure the assent of all, like the disappearance of nuclear weapons. General and complete denuclearization would have to go hand in hand with general and complete disarmament, which, unfortunately, was not a short-term goal. Regional denuclearization, for instance in Europe, would not be any more realistic. In the nuclear sphere, the reality of the situation was that the two most heavily armed Powers, fearing to exhaust themselves in a race without end, were gradually shifting in the direction of sufficiency.

72. The United Kingdom (A/S-15/PV.10) noted that confidence between East and West had increased and that greater confidence had been the catalyst of the INF Treaty and of the progress made in the strategic arms reduction talks. The latter, in turn, should further increase confidence, but the slow pace of progress underlined that there was still a long way to go. For the present, what was needed was to focus on the possible, not the speculative; on the gradual, not the Utopian; on INF and START, not the "wildly unrealistic calls for a nuclear-free world" by the year 2000. A 50 per cent reduction in super-Power strategic nuclear systems was an ambitious but realistic goal. The United Kingdom remained committed to stability and security at lower levels of forces.

73. Among other countries, India (A/S-15/PV.14) urged the international community immediately to undertake negotiations with a view to adopting a time-bound action plan to usher in a world order free of nuclear weapons. This involved negotiating a binding commitment to general and complete disarmament, focusing on the elimination of all nuclear weapons in three stages, over the next 22 years. In the first stage, India envisaged a 50 per cent reduction in the United States-Soviet strategic arsenals; immediate cessation of the production of nuclear weapons and weapons-grade fissionable materials; a moratorium on testing of nuclear weapons to set the stage for negotiations on a comprehensive nuclear test ban; an international convention to outlaw the threat or use of nuclear weapons; negotiations for replacing the non-proliferation Treaty, in 1995, by a new treaty to give legal effect to a binding commitment by nuclear-weapon States to eliminate all nuclear weapons by the year 2010 and by all non-nuclear States not to cross the nuclear weapon threshold; and strict measures to end all covert and overt assistance to those seeking to acquire nuclear weapons. India also proposed arrangements for controlling, by systematic monitoring, the continuous qualitative upgrading of nuclear and conventional weapons, through increasing transparency in research and development in frontier technologies with military applications. All this would be done under an integrated multilateral verification system.

74. Nigeria (A/S-15/PV.11) called for priority consideration of the threat posed by nuclear weapons. As long as nuclear weapons existed in the arsenals of States, the possibility of their use could not be ruled out. That was particularly so in view of the dogmatic clinging to the theory of nuclear deterrence, a theory which, in Nigeria's view, no longer had validity or credibility. Recalling the statement of the leaders of the two major Powers that "a nuclear war cannot be won and must never be fought", it maintained that the logic of nuclear disarmament could no longer be attributed only to the non-aligned and neutral States, but to all States which were genuinely concerned with common global security. Zimbabwe (A/S-15/PV.2) urged all States to agree to specific measures and to a time-frame for the prevention

of nuclear war and for nuclear disarmament. Meanwhile, the efficacy of non-proliferation could be enhanced by binding arrangements not to use or threaten to use nuclear weapons against non-nuclear-weapon States.

75. Mexico (A/S-15/PV.12) welcomed the progress made by the two major Powers in the field of nuclear arms reductions, but also insisted on the decisive importance of negotiations of multilateral scope. Member States must look beyond the horizon of passing circumstances and pursue goals of fundamental importance, namely, the prevention of nuclear war, the cessation of nuclear weapon tests, the reduction and elimination of strategic nuclear weapons and their delivery vehicles and the prevention of an arms race in outer space. Argentina (A/S-15/PV.2) noted that the arms race affected directly not only the normal development of relations among nations but also international economic growth, imposing restraints on the potential for development of all countries, rich or poor, producers or importers of arms, whether they have opted to be aligned or preferred neutrality and non-alignment. This situation was made worse by the nuclear-arms race based on a nihilist conception of human beings, defining them as a nameless mass, as a resource to be controlled or destroyed in the name of abstract considerations.

76. The questions related to the nuclear-arms race and nuclear war, as well as to the consequences of the arms race, have been discussed also in the Conference on Disarmament, the single multilateral negotiating body. Since 1979, along with views expressed in the general debates, these questions have been raised mainly under agenda items "Cessation of the nuclear arms race and nuclear armament" and "Prevention of nuclear war, including all related matters".

77. As a group, the Western States have stressed the special significance they attached to an in-depth consideration of nuclear items. This interest is derived from the overriding necessity of avoiding war and strengthening international security and stability in the nuclear age. In their view the prevention of nuclear war was a global concern and not merely the responsibility of certain States or military alliances. Developments in East-West relations have suggested that real progress was possible in the field of arms control and disarmament. Western countries have stated their belief that nuclear issues could only be dealt with satisfactorily in a broader context of prevention of war in general. They are satisfied with the progress made particularly in connection with the INF Treaty and have reaffirmed their desire for the conclusion as soon as possible of an agreement significantly reducing the strategic nuclear arsenals of the two major nuclear Powers by eliminating destabilizing offensive capabilities. 29/

78. A group of socialist States has stressed that the cessation of the nuclear-arms race and nuclear disarmament remained an issue of the highest priority and pointed out that the positive changes in East-West relations lately had resulted in a considerable lessening of tension in international relations. They have noted that there was an expectation of sustained momentum in, and results produced by, the continuing talks between the USSR and the United States on 50 per cent reductions in their strategic nuclear arsenals, with the continuing authority of the ABM Treaty upheld. They have taken the view that the Conference on Disarmament should enter into result-oriented dialogue and proceed to negotiations where possible. In their opinion, the overall problem of nuclear disarmament also comprised the

cessation of the production of fissionable material for weapons purposes. They have further cautioned against efforts which might offset the reduction of nuclear weapons already achieved or those envisaged by introducing new nuclear systems. 30/

79. China has found the marked improvement in the international situation gratifying and noted that the two major Powers had "had to admit that a nuclear war cannot be won and must never be fought". Giving priority to nuclear items and taking note of preliminary progress in nuclear disarmament, it has also paid attention to the importance and urgency of conventional disarmament. It has noted that in an area with high concentrations of conventional and nuclear arms, a conventional war was likely to escalate into a nuclear war. Therefore, it has considered that the Conference on Disarmament should find appropriate ways to play concrete and helpful roles in that field. 31/

80. The Group of 21 has reaffirmed its conviction of the paramount need for urgent multilateral negotiations on the cessation of the nuclear-arms race and nuclear disarmament and for the adoption of concrete measures leading to the complete elimination of nuclear weapons. Its basic position was that all nations had a vital interest in negotiations on nuclear disarmament, because the existence of nuclear weapons in the arsenals of a handful of States and their quantitative and qualitative development directly jeopardized the security of both nuclear and non-nuclear-weapon States. Some members of the Group pointed out that since the entry into force of the NPT in 1970, nuclear weapons had multiplied several times over, thereby increasing the threat of annihilation posed by the very existence of such weapons. In their view, military doctrines based on the possession of nuclear weapons and thus admitting the possibility of their use were indefensible, for it was unacceptable that the threat of the annihilation of human civilization be used by some States to promote their security. In connection with the forthcoming Fourth Review Conference of the NPT, some members of the Group of 21 emphasized the need for strengthening the non-proliferation régime by additional measures such as the conclusion of a comprehensive test-ban treaty, the establishment of nuclear-weapon-free zones and assurances to non-nuclear-weapon States against the use or threat of use of nuclear weapons. 32/

81. To conclude, it may be recalled that the General Assembly of the United Nations, in paragraph 13 of the Final Document of the Tenth Special Session, emphasizing security through arms limitation, stated:

> "Genuine and lasting peace can only be created through the effective implementation of the security system provided for in the Charter of the United Nations and the speedy and substantial reduction of arms and armed forces, by international agreement and mutual example, leading ultimately to general and complete disarmament under effective international control. At the same time, the causes of the arms race and threats to peace must be reduced and to this end effective action should be taken to eliminate tensions and settle disputes by peaceful means."

Notes

1/ See Economic and Social Consequences of the Arms Race and of Military Expenditures (United Nations publication, Sales No. E.83.IX.2), chap. I.

2/ See World Armaments and Disarmament, SIPRI Yearbook 1988, pp. 65-74.

3/ Study on Deterrence. Its implications for disarmament and the arms race, negotiated arms reductions and international security and other related matters (United Nations publication, Sales No. E.87.IX.2), pp. 126-127.

4/ Ibid., p. 127.

5/ A Comprehensive Concept of Arms Control and Disarmament. Adopted by Heads of State and Government at the meeting of the North Atlantic Council in Brussels on 29 and 30 May 1989 (NATO Information Service, Brussels 1989), para. 32.

6/ Study on Deterrence, pp. 126-128.

7/ Ibid., p. 129.

8/ Document A/42/313-S/18888, p. 4.

9/ Ibid., p. 11.

10/ The communiqué of the Meeting of the Political Consultative Committee of the States Parties to the Warsaw Treaty, held in Bucharest on 7 and 8 July 1989 (A/44/386), annex II, section III.

11/ Study on Deterrence, pp. 126-128.

12/ Ibid., pp. 129-141.

13/ United Nations Disarmament Yearbook, Vol. 9: 1984 (United Nations publication, Sales No. E.85.IX.4), chap. II.

14/ Document A/S-15/27, paras. 5, 11 and 18.

15/ Final documents of the Ninth Conference of Heads of State or Government of the Movement of Non-Aligned Countries, held in Belgrade from 4 to 7 September 1989 (A/44/551-S/20870), section "International Security and Disarmament", paras. 8 and 9.

16/ World Armaments and Disarmament, SIPRI Yearbook 1989, p. 12 and p. 15.

17/ Ibid., pp. 13, 16-17, 18, 19 and 20.

18/ The USSR-United States statement on the Geneva meeting of the Soviet Foreign Minister and the American Secretary of State, 8 January 1985. The text of the statement appears in the United Nations publication Disarmament, vol. VIII, No. 1 (Sales No. E.85.IX.3).

19/ CD/875, Appendix II, vol. II, PV.478.

20/ Ibid., PV.471.

21/ CD/956, Appendix II, vol. II, PV.523.

22/ Ibid.

23/ CD/845 and CD/847, submitted by the USSR and the United States, respectively.

24/ For more details, see Comprehensive Study on Nuclear Weapons, paras. 46-55, and SIPRI, Tactical Nuclear Weapons, European Perspectives (London, Taylor and Francis, 1978).

25/ Study on the Economic and Social Consequences of the Arms Race and Military Expenditures (United Nations publication, Sales No. E.89.IX.2), para. 172.

26/ Ibid., para. 174.

27/ The Relationship between Disarmament and Development (United Nations publication, Sales No. E.82.IX.1).

28/ Study on the Economic and Social Consequences of the Arms Race and Military Expenditures (United Nations publication, Sales No. E.89.IX.3), para. 69.

29/ Official Records of the General Assembly, Forty-fourth Session, Supplement No. 27 (A/44/27), para. 68.

30/ Ibid., paras. 65 and 66.

31/ Ibid., para. 84.

32/ Ibid., paras. 60, 62 and 63.

Annex

Note: The citing of this information is for illustrative purposes only - it does not imply endorsement of the data by any Government or by the United Nations.

Table 1. United States strategic nuclear forces, January 1990

Weapon system				Warheads		
Type	No. deployed	Year deployed	Range (km)	Warhead x yield	Type	No. deployed
ICBMs						
Minuteman II	450	1966	12 500	1 x 1.2 Mt	W56	450
Minuteman III (Mk 12)	200	1970	13 000	3 x 170 kt	W62	600
Minuteman III (Mk 12A)	300	1979	13 000	3 x 335 kt	W78	900
MX	50	1986	11 000+	10 x 300 kt	W87	500
Total	**1 000**					**2 450**
SLBMs						
Poseidon (13 SSBNs)	208	1971	4 600	10 x 50 kt	W68	2 080
Trident I (20 SSBNs)	384	1979	7 400	8 x 100 kt	W76	3 072
Total	592					5 152
Bombers[a]						
B-1B	90	1986	9 800	ALCM	W80-1	1 600
B-52G/H	173	1958/61	16 000	SRAM	W69	1 100
FB-111A	48	1969	4 700	Bombs	[b]	1 800
Total	**311**					**4 500**
Refuelling aircraft						
KC-135 A/R/E	615	1957	..	..	..	..
KC-10A	60	1981	..	..	..	..

[a] Numbers reflect Primary Authorized Aircraft. An additional 7 B-1Bs, 21 B-52s and 10 FB-111s are in the total inventory. B-52Gs at Andersen, AFB, Guam; Loring AFB, Maine; and Barksdale AFB, Louisiana, some 47 aircraft, have exclusively conventional missions. Bombers are loaded in a variety of ways, depending on mission. B-1Bs normally carry up to 16 weapons (SRAMs and either B83 or B61 bombs). B-52s can carry a mix of 8–24 weapons. FB-111s can carry up to 6 weapons (SRAMs or B61 or B43 bombs).

[b] Bomber weapons include four different nuclear bomb designs (B83, B61-0, -1, -7, B53, B43) with yields from low-kt to 9 Mt, ALCMs with selectable yields from 5 to 150 kt, and SRAMs with a yield of 170 kt.

Sources: Cochran, T. B., Arkin, W. M. and Norris, R. S., *Nuclear Weapons Databook, Volume I: US Forces and Capabilities*, 2nd edn (Harper & Row: New York, forthcoming); authors' estimates.

Source: World Armaments and Disarmament, SIPRI Yearbook 1990, p.14.

Table 2. Soviet strategic nuclear forces, January 1990

Weapon system					Warheads	
Type	NATO code-name	No. deployed	Year deployed	Range (km)	Warhead x yield	No. deployed
ICBMs						
SS-11 Mod. 2		150	1973	13 000	1 x 1.1 Mt	150
Mod. 3	Sego	210	1973	10 600	3 x 350 kt (MRV)	210[a]
SS-13 Mod. 2	Savage	60	1973	9 400	1 x 750 kt	60
SS-17 Mod. 2	Spanker	100	1979	10 000	4 x 750 kt (MIRV)	400
SS-18 Mod. 4/5	Satan	296/12	1979	11 000	10 x 550/750 kt (MIRV)	3 080
SS-19 Mod. 3	Stiletto	300	1979	10 000	6 x 550 kt (MIRV)	1 800
SS-24 Mod. 1/2	Scalpel	18/40	1987	10 000	10 x 550 kt (MIRV)	580
SS-25	Sickle	170	1985	10 500	1 x 550 kt	170
Total		1 356				6 450
SLBMs						
SS-N-6 Mod. 3	Serb	192	1973	3 000	2 x 1 Mt (MRV)	192[a]
SS-N-8 Mod. 1/2	Sawfly	286	1973	7 800	1 x 1.5 Mt	286
SS-N-17	Snipe	12	1980	3 900	1 x 1 Mt	12
SS-N-18 Mod. 1/3	Stingray	224	1978	6 500	7 x 500 kt	
Mod. 2			1978	8 000	1 x 1 Mt	1 568
SS-N-20	Sturgeon	120	1983	8 300	10 x 200 kt	1 200
SS-N-23	Skiff	96	1986	8 300	4 x 100 kt	384
Total		930				3 642
Bombers						
Tu-95	Bear B/C	20	1962	12 800	4 bombs or 1 AS-3	80
Tu-95	Bear G	45	1984	12 800	4 bombs and 2 AS-4	270
Tu-95	Bear H	80	1984	12 800	8 AS-15 ALCMs or bombs	640
Tu-160	Blackjack	17	1988	14 600	6 AS-15 ALCMs, 4 AS-16 SRAMs and 4 bombs	238
Total		162				1 228
Refuelling aircraft	..	140–170	..	..	..	..
ABMs						
ABM-1B	Galosh Mod.	32	1986	320	1 x unknown	32
ABM-3	Gazelle	68	1985	70	1 x low yield	68
Total		100				100

[a] SS-11 and SS-N-6 MRV warheads are counted as one.

Sources: Authors' estimates derived from: Cochran, T. B., Arkin, W. M., Norris, R. S. and Sands, J. I., *Nuclear Weapons Databook, Volume IV, Soviet Nuclear Weapons* (Harper & Row: New York, 1989); US Department of Defense, *Soviet Military Power*, 1st–8th edns; DIA, *Force Structure Summary–USSR, Eastern Europe, Mongolia, and Afghanistan*, DDB-2680-170-89, Feb. 1989; Berman, R. P. and Baker, J. C., *Soviet Strategic Forces: Requirements and Responses* (Brookings Institution: Washington, DC, 1982); Congressional Budget Office, *Trident II Missiles: Capability, Costs, and Alternatives*, July 1986; Collins, J. M. and Rennack, D. E., *U.S./Soviet Military Balance*, Library of Congress/Congressional Research Service, Report no. 88-466S, 8 Aug. 1989; Background briefing on *SMP, 1986*, 24 Mar. 1986; SASC/SAC, *Soviet Strategic Force Developments, Senate Hearing 99-335*, June 1985; Polmar, N., *Guide to the Soviet Navy*, 4th edn (US Naval Institute, Annapolis, Md., 1986); TASS news agency report, 15 Dec. 1989.

Source: World Armaments and Disarmament, SIPRI Yearbook 1990, pp.16-17

Table. United States theatre nuclear forces, January 1990

Weapon system				Warheads		
Type	No. deployed	Year deployed	Range (km)	Warhead x yield	Type	No. in stockpile
Land-based systems						
Aircraft[a]	2 250	..	1 060–2 400	1–3 x bombs	Bombs[a]	1 800
Missiles						
Pershing II	70	1983	1 790	1 x 0.3–80 kt	W85	125[b]
GLCM	212	1983	2 500	1 x 0.2–150 kt	W84	325[b]
Pershing 1A	72	1962	740	1 x 60–400 kt	W50	100[c]
Lance	100	1972	125	1 x 1–100 kt	W70	1 282
Nike Hercules	0	1958	160	1 x 1–20 kt	W31	0[d]
Other systems						
Artillery[e]	4 700	1956	30	1 x 0.1–12 kt	[e]	1 540
ADM (special)	150	1964	..	1 x 0.01–1 kt	W54	150
Naval systems						
Carrier aircraft[f]	1 100	..	550–1 800	1–2 x bombs	Bombs[f]	1 350
Tomahawk SLCM	300	1984	2 500	1 x 5–150 kt	W80-0	300
ASW aircraft[g]	710	..	1 160–3 800	1 x <20 kt	B57	850

[a] Aircraft include the US Air Force F-4D/E, F-15E, F-16A/B/C/D and F-111A/D/E/F. Bombs include three types (B43, B57 and B61) with yields from sub-kt to 1.45 Mt.

[b] Warheads will likely be placed in inactive reserve in the US stockpile.

[c] Missiles are deployed with FRG forces. Warheads are in US custody.

[d] The few remaining missiles deployed with the FRG will be retired in 1990.

[e] Total inventory of US Army and Marine Corps nuclear-capable artillery. There are two types of nuclear artillery (155-mm and 203-mm) with four different warheads: a 0.1-kt W48, 155-mm shell; a 1- to 12-kt W33, 203-mm shell; a 0.8-kt W79-1, enhanced-radiation, 203-mm shell; and a variable-yield (up to 1.1 kt) W79-0 fission warhead. The enhanced-radiation warheads will be converted to standard fission weapons.

[f] Aircraft include the US Navy A-6E, A-7E, F/A-18A/B and Marine Corps A-6E and AV-8B. Bombs include three types with yields from 20 kt to 1 Mt.

[g] Aircraft include US Navy P-3A/B/C, S-3A/B and SH-3D/H helicopters. Some US B57 nuclear depth bombs are allocated for British Nimrod, Italian Atlantic and Netherlands P-3 aircraft.

Sources: Cochran, T. B., Arkin, W. M. and Norris, R. S., *Nuclear Weapons Databook, Volume 1: US Forces and Capabilities*, 2nd edn (Harper & Row: New York, forthcoming); Collins, J. M. and Rennack, D. E., *US/Soviet Military Balance*, Library of Congress/Congressional Research Service, Report no. 89-4665, 8 Aug. 1989; International Institute for Strategic Studies, *The Military Balance 1989–1990* (IISS: London, 1989); authors' estimates.

Source: World Armaments and Disarmament, SIPRI Yearbook 1990, p.15

Table 4: Soviet theatre nuclear forces, January 1990

Weapon system					Warheads	
Type	NATO code-name	No. deployed[a]	Year first deployed	Range[b] (km)	Warhead x yield	No. deployed[a]
Land-based systems						
Aircraft						
Tu-26	Backfire A/B/C	190	1974	4 000	1–3 x bombs or ASMs	380
Tu-16	Badger A/G	200	1954	3 100	1–2 x bombs or ASMs	200
Tu-22	Blinder A/B	75	1962	2 400	1–2 x bombs or 1 ASM	75
Tactical aircraft[c]		2 485	..	700–1 300	1–2 x bombs	2 500
Missiles						
SS-20	Saber	190	1977	5 000	3 x 250 kt	570
SS-1c	Scud B	661	1965	300	1 x 1–10 kt	1 370
..	FROG 3/5/7	370	1965	70	1 x 1–25 kt	1 450
SS-21[d]	Scarab	289	1978	70	1 x 10–100 kt	310
SSC-1b	Sepal	50	1962	450	1 x 50–200 kt	50
SAMs[e]	..	5 900	1958–80	50–300	1 x low kt	2 400
Other systems						
Artillery[f]	..	6 760	1973–80	10–30	1 x low kt	2 000
ADMs	..	?	?	?	?	?
Naval systems						
Ballistic missiles						
SS-N-5	Sark	18	1963	1 400	1 x 1 Mt	18
Aircraft						
Tu-26	Backfire A/B/C	160	1974	4 000	1–3 x bombs or ASMs	320
Tu-16	Badger A/C/G	135	1955	3 100	4 x bombs or ASMs	540
Tu-22	Blinder A	20	1962	2 400	4 x bombs	80
ASW aircraft[g]	..	365	1966–82	..	1 x depth bombs	400
Anti-ship cruise missiles[h]						
SS-N-3 b/a,c	Shaddock/Sepal	228	1960	450	1 x 350 kt	120
SS-N-7	Starbright	64	1968	65	1 x 200 kt	32
SS-N-9	Siren	230	1969	280	1 x 200 kt	86
SS-N-12	Sandbox	216	1976	550	1 x 350 kt	80
SS-N-19	Shipwreck	160	1980	550	1 x 500 kt	72
SS-N-22	Sunburn	120	1981	100	1 x 200 kt	40
Land-attack cruise missiles						
SS-N-21	Sampson	15	1987	3 000	1 x 200 kt	90
ASW missiles and torpedoes						
SS-N-15	Starfish	375	1973	37	1 x 10 kt	375
SS-N-16	Stallion		1979	120	1 x 10 kt	
FRAS-1	..	25	1967	30	1 x 5 kt	25
Torpedoes[i]	Type 65	475	1965	16	1 x low kt	475
	ET-80		1980	>16	1 x low kt	
Naval SAMs						
SA-N-1	Goa	65	1961	22	1 x 10 kt	220
SA-N-3	Goblet	43	1967	37	1 x 10 kt	

Table 4 (continued)

[a] For missile systems, the number is for operational or deployed missiles on launchers (see the Memorandum of Understanding of the INF Treaty, in *SIPRI Yearbook 1988*, appendix 13B).

[b] Range for aircraft indicates combat radius, without refuelling.

[c] Nuclear-capable tactical aircraft models include 130 MiG-21 bis Fishbed L, 855 MiG-27 Flogger D/J, 750 Su-17 Fitter C/D/H, and 750 Su-24 Fencer A/B/C/D/E. New estimate reflects distinction between ground attack and counter-air; see DIA, *Force Structure*, p. 18.

[d] Includes SS-21s in GDR and Czechoslovak units.

[e] Nuclear-capable land-based surface-to-air missiles probably include SA-2 Guideline, SA-5 Gammon and SA-10 Grumble.

[f] Nuclear-capable artillery include systems of the three calibres: 152-mm (D-20, M-1976, 2S3 and 2S5), 203-mm (M55, 2S7 and M-1980) and 240-mm (2S4 and M-240). Some older systems may also be nuclear-capable.

[g] Includes 90 Be-12 Mail, 45 Il-38 May and 60 Tu-142 Bear F patrol aircraft. Land- and sea-based helicopters include 95 Ka-25 Hormone and 75 Ka-27 Helix models.

[h] Number deployed is total launchers on nuclear-capable ships and submarines. Warheads based on an average of 2 nuclear-armed cruise missiles per nuclear-capable surface ship, except for 4 per Kiev and Kirov Class ships, and 4 per nuclear-capable cruise missile submarine, except for 12 on the Oscar Class.

[i] The two types of torpedo are the older and newer models, respectively, with the ET-80 probably replacing the Type 65.

Sources: Cochran, T. B., Arkin, W. M., Norris, R. S. and Sands, J. I., *Nuclear Weapons Databook. Volume IV, Soviet Nuclear Weapons* (Harper & Row: New York, 1989); Polmar, N., *Guide to the Soviet Navy*, 4th edn (US Naval Institute: Annapolis, Md., 1986); Department of Defense, *Soviet Military Power*, 1st–8th edns; DIA, *Force Structure Summary–USSR, Eastern Europe, Mongolia, and Afghanistan*, DDB-2680-170-89, Feb. 1989; Collins, J. M. and Rennack, D. E., *US/Soviet Military Balance*, Library of Congress/Congressional Research Service, Report No. 89-4665, 8 Aug. 1989; IISS, *The Military Balance 1989–1990* (Brassey's: London, 1989); NATO, *Conventional Forces in Europe: The Facts*, 25 Nov. 1988; interviews with US DOD officials, Apr. and Oct. 1986; Handler, J. and Arkin, W. M., *Nuclear Warships and Naval Nuclear Weapons: A Complete Inventory*, Neptune Paper no. 2 (Greenpeace/Institute for Policy Studies: Washington, DC, 1988).

Source: World Armaments and Disarmament, SIPRI Yearbook 1990, pp. 18-19

Table 5: United Kingdom nuclear forces, January 1990

Weapon system				Warheads		
Type	No. deployed	Year deployed	Range (km)[b]	Warhead x yield	Type	No. in stockpile
Aircraft						
Tornado GR-1	220	1982	1 300	1–2 x 400/200 kt bombs[c]	WE-177A/B	155–175[d]
Buccaneer S2B	25	1962	1 700	1 x 400/200 kt bomb	WE-177A/B	
SLBMs						
Polaris A3-TK	64	1982[e]	4 700	2 x 40 kt	MRV	96[f]
Carrier aircraft						
Sea Harrier FRS.1[g]	42	1980	450	1 x 10 kt bomb	WE-177C	
ASW helicopters						
Sea King HAS 5	56	1976	–	1 x 10 kt depth bomb	WE-177C	25[h]
Lynx HAS 2/3	78	1976	–	1 x 10 kt depth bomb	WE-177C	

Table 5 (continued)

[a] British systems certified to use US nuclear weapons include 31 Nimrod ASW aircraft based in the UK, and 20 Lance launchers (1 regiment of 12 launchers, plus spares) and 135 artillery guns in 5 regiments (120 M109 and 15 M110 howitzers) based in FR Germany.

[b] Range for aircraft indicates combat radius, without refuelling.

[c] The US Defense Intelligence Agency (DIA) has confirmed that the RAF Tornados 'use two types of nuclear weapons, however, exact types are unknown'. The DIA further concludes that each RAF Tornado is capable of carrying 2 nuclear bombs, on the 2 outboard fuselage stations.

[d] The total stockpile of WE-177 tactical nuclear gravity bombs is about 180–200, of which 155–75 are versions A and B. All three weapons use the same basic 'physics package', and the yield is varied by using different amounts of tritium.

[e] The two-warhead Polaris A3-TK (Chevaline) was first deployed in 1982 and has now completely replaced the original three-warhead Polaris A-3 missile (first deployed in 1968).

[f] In previous *SIPRI Yearbooks* the British strategic stockpile was estimated at 128 warheads: 64 two-warhead Polaris A3-TK SLBMs on four SSBNs. It is now thought that Britain produced only enough warheads for three full boat-loads of missiles, or 48 missiles, with a total of 96 warheads. In Mar. 1987 French President Mitterrand confirmed that Britain had '90 to 100 [strategic] warheads'.

[g] The US DIA has concluded that the Sea Harrier is not nuclear-capable, even though every British Defence White Paper since 1981 states that it is.

[h] The C version of the WE-177 bomb is believed to be assigned to selected Royal Navy (RN) Sea Harrier FRS.1 aircraft and ASW helicopters. The WE-177C exists in both a free-fall and depth bomb modification, by varying the fuzing and casing options. There are an estimated 25 WE-177Cs, each with a yield of approximately 10 kt (possible variable yield).

Sources: British Ministry of Defence, *Statement on the Defence Estimates*, 1980–89 (Her Majesty's Stationery Office: London, annual); Campbell, D., 'Too few bombs to go round', *New Statesman*, 29 Nov. 1985, pp. 10–12; Nott, J., 'Decisions to modernise UK's nuclear contribution to NATO strengthen deterrence', *NATO Review*, vol. 29, no. 2 (Apr. 1981); US Defense Intelligence Agency, various reports released under the Freedom of Information Act; Urban, M., *The Independent*: including Urban, M., 'Outdated nuclear bomb's credibility in question', *The Independent*, 16 May 1988, p. 5; Urban, M., 'Clarification', *The Independent*, 17 May 1988. Additional sources: François Mitterrand, French President, an interview translated by the Service de Presse et d'Information of the French Embassy, London, 29 Mar. 1987, p. 6.

Source: World Armaments and Disarmament, SIPRI Yearbook 1990, p.20

Table 6: French nuclear forces, January 1990

Weapon system				Warheads		
Type	No. deployed	Year deployed	Range (km)[a]	Warhead x yield	Type	No. in stockpile
Aircraft						
Mirage IVP/ASMP	18	1986	1 500	1 x 300 kt	TN 80	18
Mirage 2000N/ASMP[b]	42	1988	1 570	1 x 300 kt	TN-81	24
Jaguar A	45	1974[c]	750	1 x 6–8/25 kt bomb[d]	AN-52[e]	45
Refuelling aircraft						
C-135/FR	11	1965	..	..	..	..
Land-based missiles						
S3D	18	1980	3 500	1 x 1 Mt	TN-61	18
Pluton	44	1974	120	1 x 10/25 kt	AN-51[e]	70
Submarine-based missiles						
M-20	48	1977	3 000	1 x 1 Mt	TN-61	48
M-4A	16	1985	4 000–5 000	6 x 150 kt (MIRV)	TN-70[f]	96
M-4B	32	1987	6 000	6 x 150 kt (MIRV)	TN-71	192
Carrier-based aircraft						
Super Etendard/ASMP[g]	36	1978[c]	650	1 x 6–8/25 kt bomb or 1 x 300 kt ASMP	AN-52[e]	24

Table 6: (continued)

[a] Range for aircraft indicates combat radius, without refuelling, and does not include the 90- to 350-km range of the ASMP air-to-surface missile (where applicable).

[b] The Mirage 2000/ASMP has completely replaced the Mirage IIIE in the tactical nuclear role and will replace one Jaguar A squadron (15 aircraft) in July 1990. 75 Mirage 2000N aircraft are planned.

[c] The Jaguar A and Super Etendard aircraft were first deployed in 1973 and 1978, respectively, although they did not carry nuclear weapons (the AN-52) until 1974 and 1981, respectively.

[d] Two-thirds of the AN-52 stockpile reportedly consists of the low-yield variant, and one-third the high-yield variant. The AN-52 has an estimated weight of 455 kg, length of 4.2 m, diameter of 0.6 m and span of 0.8 m.

[e] The same nuclear device is used for both the AN-52 warhead (gravity bomb) and the AN-51 warhead (Pluton). Both warheads have the same higher yield of 25 kt (thus said to have the MR-50 charge in common), yet have lower yields of 6–8 kt and 10 kt, respectively.

[f] The *Inflexible* was the only SSBN to receive the TN-70. All subsequent refits of the M-4 into Redoutable Class SSBNs will incorporate the improved TN-71 warhead.

[g] The Super Etendard can carry either 1 AN-52 bomb or 1 ASMP missile. At full strength the AN-52 equipped 2 squadrons (24 aircraft) of Super Etendard: Flotilles 11F and 17F, based at Landivisiau and Hyères, respectively. From mid-1989 these two squadrons began receiving the ASMP missile. By mid-1990, all 20 aircraft (to be configured to carry the ASMP) will be operational. Although originally about 50–55 Super Etendard aircraft were to receive the ASMP, because of budgetary contraints the number of aircraft so configured dropped to 20.

Sources: Commissariat à l'Energie Atomique (CEA), 'Informations non classifiées sur l'armement nucléaire français', 26 June 1986; US Defense Intelligence Agency (DIA), *A Guide to Foreign Tactical Nuclear Weapon Systems under the Control of Ground Force Commanders*, DST-1040S-541-83, 9 Sep. 1983, with CHG 1 and 2 (secret, partially declassified), 17 Aug. 1984 and 9 Aug. 1985; Boucheron, J. M., *L'Equipement Militaire pour les Années 1990–1993* (Assemblée Nationale: Paris, 1989); Prime Minister, *L'Organisation de la Défense de la France*, no. 15 (Nov. 1985), p. 32.

Source: World Armaments and Disarmament, SIPRI Yearbook 1990, p.21

Table 7: Chinese nuclear forces, January 1990

Weapon system				Warheads	
Type	No. deployed	Year deployed	Range (km)	Warhead x yield	No. in stockpile
Aircraft[a]					
H-5 (Il-28 Beagle)	20	1974	1 850	1 x bomb[b]	20
H-6 (Tu-16 Badger)	120	1965	5 900	1–3 x bombs	130
Land-based missiles					
DF-2 (CSS-1)	20–30	1966	1 450	1 x 20 kt	20–30
DF-3 (CSS-2)	60–80	1970	2 600	1 x 1–3 Mt	50–80
DF-4 (CSS-3)	~10	1971	4 800–7 000	1 x 1–3 Mt	10
DF-5 (CSS-4)	~10	1979	13 000	1 x 4–5 Mt	10
M9/SST 600	..	1989	600	1 x low kt	..
Submarine-based missiles[c]					
JL-1 (CSS-N-3)	24	1986	3 300	1 x 200 kt–1 Mt	26–38

[a] All figures for these bomber aircraft refer to nuclear-configured versions only. Hundreds of these aircraft are also deployed in non-nuclear versions.

[b] Yields of bombs are estimated to range from below 20 kt to 3 Mt.

[c] Two missiles are presumed to be available for rapid deployment on the Golf Class submarine (SSB). Additional missiles are being built for new Xia Class submarines.

Sources: *SIPRI Yearbook 1989*; Defense Intelligence Agency, *Handbook of the Chinese People's Liberation Army*, DDB-2680-32-84, Nov. 1984; Defence Intelligence Agency, 'A guide to foreign tactical nuclear weapon systems under the control of ground force commanders', DST-1040S-541, 4 Sep. 1987; Lewis, J. W. and Xue, L., *China Builds the Bomb* (Stanford University Press: Stanford, Calif., 1988); Jencks, H. W., 'PRC nuclear and space programs', in ed. R. Yang, *SCPS Yearbook on PLA Affairs, 1987* (Sun Yat-sen Center for Policy Studies: Kaohsiung, Taiwan, 1988), chapter 8; author's estimates.

Source: World Armaments and Disarmament, SIPRI Yearbook 1990, p.22